

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

January 2004

## Tests 2212 & 2213: Challenger MT 535B Autopower IV Diesel

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>

 Part of the [Applied Mechanics Commons](#)

---

"Tests 2212 & 2213: Challenger MT 535B Autopower IV Diesel" (2004). *Nebraska Tractor Tests*. 323.  
<https://digitalcommons.unl.edu/tractormuseumlit/323>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# SUMMARY OF OECD TESTS 2212 & 2213—NEBRASKA SUMMARY 506 CHALLENGER MT 535B AUTOPOWER IV DIESEL 32 SPEED

## POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal./hr (l/h)	lb./hp.hr (kg/kW.h)	Hp./hr/gal (kW.h/l)	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1100 rpm)					
105.9 (79.0)	2200	7.27 (27.53)	0.487 (0.296)	14.57 (2.87)	
Standard Power Take-off Speed(1000 rpm)					
112.9 (84.2)	2000	7.20 (27.25)	0.452 (0.273)	15.68 (3.09)	
Maximum Power (2 hours)					
116.3 (86.7)	1798	6.99 (26.46)	0.426 (0.259)	16.63 (3.28)	

## VARYING POWER AND FUEL CONSUMPTION

105.9 (79.0)	2200	7.27 (27.53)	0.487 (0.296)	14.57 (2.87)	Air temperature
91.2 (68.0)	2214	6.56 (24.82)	0.510 (0.310)	13.90 (2.74)	73°F(23°C)
69.2 (51.6)	2236	5.46 (20.66)	0.559 (0.340)	12.68 (2.50)	Relative humidity
45.9 (34.2)	2256	4.37 (16.55)	0.675 (0.411)	10.51 (2.07)	46%
23.7 (17.7)	2276	3.26 (12.33)	0.973 (0.592)	7.29 (1.44)	Barometer
--	2295	2.19 (8.28)	--	--	30.1" Hg(101.9 kPa)

Maximum Torque - 373.7 lb.-ft. (506.7 Nm) at 1402 rpm

Maximum Torque Rise - 47.7%

Torque rise at 1750 engine rpm - 37%

## DRAWBAR PERFORMANCE (Unballasted - Front Drive Engaged) FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb./hp.hr (kg/kW.h)	Hp./hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
Maximum Power—12th(4TA) Gear									
79.1 (59.0)	6160 (27.4)	4.82 (7.76)	2202	5.0	0.597 (0.363)	11.88 (2.34)	187 (86)	59 (15)	30.2 (102.2)
75% of Pull at Maximum Power—12th(4TA) Gear									
60.3 (45.0)	4620 (20.6)	4.90 (7.88)	2217	4.2	0.678 (0.413)	10.46 (2.06)	183 (84)	59 (15)	30.2 (102.2)
50% of Pull at Maximum Power—12th(4TA) Gear									
41.0 (30.6)	3075 (13.7)	5.00 (8.05)	2233	2.4	0.808 (0.491)	8.78 (1.73)	183 (84)	59 (15)	30.2 (102.2)
75% of Pull at Reduced Engine Speed—15th(4TB) Gear									
60.3 (45.0)	4630 (20.6)	4.88 (7.85)	1895	4.1	0.568 (0.345)	12.50 (2.46)	183 (84)	59 (15)	30.2 (102.2)
50% of Pull at Reduced Engine Speed—15th(4TB) Gear									
40.9 (30.5)	3080 (13.7)	4.98 (8.02)	1907	2.9	0.665 (0.405)	10.66 (2.10)	185 (85)	59 (15)	30.2 (102.2)

**Location of tests:** Groupement d'Antony, Parc de Touvoie, BP 44 Antony, Cedex, France 92163

**Dates of tests:** May - June, 2004

**Manufacturer:** AGCO S.A. BP 307, Avenue Blaise Pascal, 60026 Beauvais, France

**FUEL and OIL:** Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.851  
**Fuel weight** 7.09 lbs/gal (0.850 kg/l) **Oil SAE** 15W40 **API service classification** CH4  
**Transmission and hydraulic lubricant** BP Terrac Tractan 9 fluid **Front axle lubricant** API GL5 - SAE 85W140

**ENGINE:** Make Perkins Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler  
**Serial No.** 3711 K05 AVS **Crankshaft** lengthwise  
**Rated engine speed** 2200 **Bore and stroke** 3.937" x 5.00" (100.0 mm x 127.0 mm) **Compression ratio** 17.5 to 1 **Displacement** 365 cu in (5985 ml) **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** thermostat and variable speed fan

**CHASSIS:** **Type** 2WD and FWA **Serial No.** M127032 **Tread width** rear 54.1" (1375 mm) to 86.8" (2205 mm) front 2WD - 65.4" (1660 mm) to 86.2" (2190 mm), FWA - 62.9" (1597 mm) to 80.0" (2033 mm) **Wheelbase** 2WD - 112.1" (2848 mm), FWA - 109.4" (2780 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph (km/h)** first 1.40 (2.26) second 1.65 (2.65) third 1.94 (3.12) fourth 2.12 (3.41) fifth 2.27 (3.65) sixth 2.48 (3.99) seventh 2.93 (4.71) eighth 3.14 (5.06) ninth 3.43 (5.52) tenth 3.67 (5.91) eleventh 4.34 (6.99) twelfth 4.87 (7.84) thirteenth 5.08 (8.17) fourteenth 5.26 (8.47) fifteenth 5.70 (9.18) sixteenth 6.16 (9.92) seventeenth 6.73 (10.83) eighteenth 7.27 (11.70) nineteenth 7.88 (12.68) twentieth 7.95 (12.79) twenty-first 8.51 (13.69) twenty-second 9.30 (14.97) twenty-third 10.98 (17.67) twenty-fourth 11.77 (18.94) twenty-fifth 12.86 (20.69) twenty-sixth 13.78 (22.17) twenty-seventh 16.26 (26.17) twenty-eighth 18.26 (29.38) twenty-ninth 19.03 (30.63) thirtieth 21.36 (34.38) thirty-first 25.22 (40.59) thirty-second 24.86 (40.00) reverse 1.40 (2.26), 1.65 (2.65), 1.94 (3.12), 2.12 (3.41), 2.27 (3.65), 2.48 (3.99), 2.93 (4.71), 3.14 (5.06), 3.43 (5.52), 3.67 (5.91), 4.34 (6.99), 4.87 (7.84), 5.08 (8.17), 5.26 (8.47), 5.70 (9.18), 6.16 (9.92), 6.73 (10.83), 7.27 (11.70), 7.88 (12.68), 7.95 (12.79), 8.51 (13.69),

## DRAWBAR PERFORMANCE

### (Unballasted - Front Drive Engaged) MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Temp.°F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
5th(1TD)Gear									
65.0 (48.5)	12345 (54.9)	1.98 (3.18)	2186	15.3	0.669 (0.407)	10.61 (2.09)	185 (85)	57 (14)	30.2 (102.2)
6th(2TB) Gear									
71.1 (53.0)	12160 (54.1)	2.19 (3.52)	2196	14.7	0.668 (0.406)	10.62 (2.09)	185 (85)	59 (15)	30.2 (102.2)
7th(2TC)Gear									
83.1 (62.0)	12095 (53.8)	2.58 (4.15)	2181	14.2	0.624 (0.379)	11.37 (2.24)	185 (85)	59 (15)	30.2 (102.2)
8th(3TA)Gear									
88.8 (66.2)	11915 (53.0)	2.79 (4.50)	2160	13.0	0.595 (0.362)	11.93 (2.35)	189 (87)	59 (15)	30.2 (102.2)
9th(2TD)Gear									
94.9 (70.8)	11625 (51.7)	3.06 (4.93)	2113	10.1	0.557 (0.339)	12.74 (2.51)	183 (84)	59 (15)	30.2 (102.2)
10th(3TB) Gear									
95.6 (71.3)	11080 (49.3)	3.24 (5.21)	2063	9.7	0.559 (0.340)	12.69 (2.50)	185 (85)	59 (15)	30.2 (102.1)
11th(3TC) Gear									
99.2 (74.0)	10230 (45.5)	3.64 (5.86)	1943	8.3	0.521 (0.317)	13.60 (2.68)	185 (85)	59 (15)	30.2 (102.1)
12th(4TA) Gear									
103.0 (76.8)	9960 (44.3)	3.88 (6.25)	1839	8.0	0.529 (0.322)	13.40 (2.64)	185 (85)	59 (15)	30.2 (102.1)
13th(3TD)Gear									
101.9 (76.0)	9240 (41.1)	4.14 (6.66)	1865	7.3	0.518 (0.315)	13.71 (2.70)	183 (84)	59 (15)	30.2 (102.2)
14th(1LA)Gear									
104.8 (78.2)	9475 (42.1)	4.15 (6.67)	1806	8.7	0.519 (0.316)	13.65 (2.69)	185 (85)	63 (17)	30.2 (102.1)
15th(4TB)Gear									
104.3 (77.8)	8715 (38.8)	4.49 (7.23)	1799	7.2	0.519 (0.316)	13.65 (2.69)	185 (85)	59 (15)	30.2 (102.2)
16th(1LB) Gear									
105.0 (78.3)	8070 (35.9)	4.88 (7.85)	1799	6.5	0.518 (0.315)	13.71 (2.70)	187 (86)	63 (17)	30.2 (102.1)
17th(4TC)Gear									
103.7 (77.3)	7250 (32.2)	5.36 (8.63)	1799	6.0	0.519 (0.316)	13.65 (2.69)	183 (84)	63 (17)	30.2 (102.1)
18th(1LC)Gear									
105.5 (78.7)	6810 (30.3)	5.81 (9.35)	1798	5.1	0.518 (0.315)	13.71 (2.70)	185 (85)	63 (17)	30.2 (102.1)
19th(4TD)Gear									
104.1 (77.6)	6170 (27.5)	6.32 (10.18)	1798	5.2	0.519 (0.316)	13.65 (2.69)	187 (86)	63 (17)	30.2 (102.1)
20th(2LA) Gear									
105.4 (78.6)	6195 (27.6)	6.38 (10.27)	1798	4.8	0.516 (0.314)	13.76 (2.71)	185 (85)	65 (18)	30.2 (102.1)
21st(1LD)Gear									
103.7 (77.3)	5675 (25.3)	6.85 (11.02)	1793	4.7	0.527 (0.320)	13.47 (2.65)	185 (85)	65 (18)	30.2 (102.1)
22nd(2LB)Gear									
102.1 (76.1)	5085 (22.6)	7.53 (12.11)	1798	4.8	0.535 (0.326)	13.24 (2.61)	185 (85)	65 (18)	30.2 (102.1)

#### Tested Without Ballast

#### TIRES AND WEIGHT

**Rear tires** - No.,size, ply & psi(kPa)

**Front tires** - No.,size, ply & psi(kPa)

**Height of Drawbar**

**Static Weight with operator-** Rear

- Front

- Total

#### Front Wheel Assist

Two 580/70R38; \*\*,15 (100)

Two 480/70R28; \*\*,16 (110)

20.5 in (520 mm)

7925 lb (3595 kg)

5465 lb (2480 kg)

13395 lb (6075 kg)

#### 2WD

Two 580/70R38; \*\*,15(100)

Two 11.00-16; 8; 40 (275)

33.5 in (850 mm)

7805 lb (3540 kg)

5510 lb (2500 kg)

13315 lb (6040 kg)

9.30 (14.97), 10.98 (17.67), 11.77 (18.94), 12.86 (20.69), 13.78 (22.17), 16.26 (26.17), 18.26 (29.38), 19.03 (30.63), 21.36 (34.38), 25.22 (40.59), 24.86 (40.00) **Clutch** multiple wet disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1976 engine rpm or 1000 rpm at 2000 engine rpm **Unladen tractor mass** 2WD - 13140 lb (5960 kg), FWA - 13215 lb (5995 kg)

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD test procedures. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **2212 & 2213**, Nebraska Summary 506, January 20, 2006.

Leonard L. Bashford  
Director

M.F. Kocher  
V.I. Adamchuk  
J.A. Smith  
Board of Tractor Test Engineers

# DRAWBAR PERFORMANCE

## (Unballasted - 2WD)

### FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
<b>Maximum Power—12th(4TA) Gear</b>									
79.8 (59.5)	6405 (28.5)	4.67 (7.52)	2205	7.8	0.632 (0.385)	11.22 (2.21)	187 (86)	73 (23)	30.0 (101.6)
<b>75% of Pull at Maximum Power—12th(4TA) Gear</b>									
61.2 (45.6)	4790 (21.3)	4.79 (7.71)	2217	5.8	0.689 (0.419)	10.30 (2.03)	187 (86)	73 (23)	30.0 (101.6)
<b>50% of Pull at Maximum Power—12th(4TA) Gear</b>									
41.7 (31.1)	3205 (14.3)	4.88 (7.85)	2240	5.1	0.847 (0.515)	8.38 (1.65)	185 (85)	73 (23)	30.0 (101.6)
<b>75% of Pull at Reduced Engine Speed—15th(4TB) Gear</b>									
60.7 (45.3)	4785 (21.3)	4.76 (7.66)	1890	6.4	0.592 (0.360)	11.98 (2.36)	183 (84)	75 (24)	30.0 (101.6)
<b>50% of Pull at Reduced Engine Speed—15th(4TB) Gear</b>									
42.0 (31.3)	3220 (14.3)	4.89 (7.87)	1917	5.2	0.713 (0.434)	9.95 (1.96)	181 (83)	75 (24)	30.0 (101.6)
<b>MAXIMUM POWER IN SELECTED GEARS</b>									
<b>6th(2TB) Gear</b>									
55.8 (41.6)	9600 (42.7)	2.18 (3.51)	2199	15.2	0.735 (0.447)	9.64 (1.90)	185 (85)	70 (21)	30.0 (101.6)
<b>7th(2TC) Gear</b>									
65.8 (49.1)	9530 (42.4)	2.59 (4.17)	2210	14.9	0.699 (0.425)	10.15 (2.00)	185 (85)	72 (22)	30.0 (101.6)
<b>8th(3TA) Gear</b>									
69.7 (52.0)	9295 (41.4)	2.81 (4.53)	2191	13.7	0.674 (0.410)	10.52 (2.07)	185 (85)	72 (22)	30.0 (101.6)
<b>9th(2TD) Gear</b>									
76.3 (56.9)	9250 (41.1)	3.09 (4.97)	2196	12.8	0.654 (0.398)	10.84 (2.14)	185 (85)	72 (22)	30.0 (101.6)
<b>10th(3TB) Gear</b>									
81.0 (60.4)	9050 (40.3)	3.36 (5.40)	2193	11.6	0.632 (0.384)	11.23 (2.21)	187 (86)	72 (22)	30.0 (101.6)
<b>11th(3TC) Gear</b>									
89.7 (66.9)	9170 (40.8)	3.67 (5.91)	2042	12.0	0.589 (0.358)	12.04 (2.37)	187 (86)	73 (23)	30.0 (101.6)
<b>12th(4TA) Gear</b>									
97.2 (72.5)	8680 (38.6)	4.20 (6.76)	2052	10.8	0.561 (0.341)	12.64 (2.49)	185 (85)	73 (23)	30.0 (101.6)
<b>13th(3TD) Gear</b>									
94.1 (70.2)	8365 (37.2)	4.22 (6.79)	1965	10.5	0.557 (0.339)	12.74 (2.51)	187 (86)	73 (23)	30.0 (101.6)
<b>14th(1LA) Gear</b>									
99.9 (74.5)	8835 (39.3)	4.24 (6.82)	1947	12.1	0.561 (0.341)	12.64 (2.49)	190 (88)	72 (22)	30.0 (101.6)
<b>15th(4TB) Gear</b>									
101.1 (75.4)	8205 (36.5)	4.62 (7.44)	1912	10.1	0.548 (0.334)	12.93 (2.55)	189 (87)	73 (23)	30.0 (101.6)
<b>16th(1LB) Gear</b>									
102.6 (76.5)	8205 (36.5)	4.69 (7.55)	1804	10.4	0.529 (0.322)	13.40 (2.64)	190 (88)	73 (23)	30.0 (101.6)
<b>17th(4TC) Gear</b>									
102.2 (76.2)	7430 (33.1)	5.16 (8.30)	1798	9.6	0.533 (0.324)	13.30 (2.62)	190 (88)	75 (24)	30.0 (101.6)
<b>18th(1LC) Gear</b>									
103.7 (77.3)	6930 (30.8)	5.61 (9.03)	1799	8.8	0.525 (0.319)	13.51 (2.66)	189 (87)	75 (24)	30.0 (101.6)
<b>19th(4TD) Gear</b>									
103.1 (76.9)	6270 (27.9)	6.17 (9.93)	1799	7.6	0.525 (0.320)	13.50 (2.66)	190 (88)	75 (24)	30.0 (101.6)
<b>20th(2LA) Gear</b>									
103.7 (77.3)	6270 (27.9)	6.20 (9.98)	1798	7.9	0.522 (0.318)	13.58 (2.68)	189 (87)	75 (24)	30.0 (101.6)
<b>21st(1LD) Gear</b>									
104.5 (77.9)	5885 (26.2)	6.66 (10.71)	1797	7.6	0.518 (0.315)	13.71 (2.70)	190 (88)	73 (23)	30.0 (101.6)
<b>22nd(2LB) Gear</b>									
102.2 (76.2)	5235 (23.3)	7.32 (11.78)	1798	7.0	0.524 (0.319)	13.54 (2.67)	192 (89)	75 (24)	30.0 (101.6)

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	2WD dB(A)	Engaged dB(A)
At no load in 12th (4TA) gear	71.0	71.0
Bystander	--	--

### THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: II

Quick Attach: None

Maximum force exerted through whole range: 8923 lbs (39.7 kN)

i) Opening pressure of relief valve: NA

Sustained pressure of the open relief valve: 2830 psi (195 bar) 2830 psi (195 bar)

ii) Pump delivery rate at minimum pressure: 28.1 GPM (106.4 l/min) 29.6 GPM (112.0 l/min)

iii) Pump delivery rate at maximum hydraulic power: 24.2 GPM (91.5 l/min) 27.2 GPM (103.0 l/min)

Delivery pressure: 2045 psi (141 bar) 2090 psi (144 bar)

Power: 28.8 hp (21.5 kW) 33.1 Hp (24.7 kW)

### THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi.(bar) 2800(193)  
Location: lift cylinder  
Hydraulic oil temperature: °F(°C) 149(65)  
Location: hydraulic sump  
Category: II  
Quick attach: none

#### SAE Static Test—System pressure 2520 psi (174 Bar)

Hitch point distance to ground level in.(mm) 8.0(203) 15.1(384) 22.0(559) 29.3(744) 36.2(919)  
Lift force on frame lb 12539 11933 11629 11129 9939  
" " " " " " (kN) (55.8) (53.1) (51.7) (49.5) (44.2)

#### HITCH DIMENSIONS AS TESTED—NO LOAD

	SAE TEST		OECD TEST	
	inch	mm	inch	mm
A	27.6	702	28.2	716
B	11.6	295	11.6	295
C	13.9	354	13.9	354
D	13.0	330	13.0	330
E	7.9	200	7.9	200
F	10.2	260	10.2	260
G	32.3	820	32.3	820
H	0.3	8	0.3	8
I	15.3	389	15.3	389
J	22.1	560	22.1	560
K	21.5	545	21.5	545
L	40.9	1040	40.9	1040
M	22.2	565	22.2	565
N	37.0	940	37.0	940
O	8.0	203	8.0	203
P	41.1	1043	46.1	1170
Q	36.0	914	36.0	914
R	29.4	748	29.4	748

